IN THE CLAIMS:

Claims 1-10, 13-15, 17-19, 22, 24-29, 31, 77, 88-90, 93, 94, 102 and 113 have been amended herein. All of the pending claims 1 through 120 are presented, pursuant to 37 C.F.R. §§ 1.121(c)(1)(i) and 1.121(c)(3), in clean form below. Please enter these claims as amended. Also attached is a marked-up version of the claims amended herein pursuant to 37 C.F.R. § 1.121(c)(1)(ii).

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1. (Amended) A rebreathing method, consisting essentially of:
effecting a nonrebreathing period; and
effecting a rebreathing period, said rebreathing period having substantially a same duration as said nonrebreathing period.

2. (Amended) The rebreathing method of claim 1, wherein said nonrebreathing period and said rebreathing period are each effected for about 30 seconds.

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3. (Amended) The rebreathing method of claim 1, wherein said nonrebreathing period is effected for a duration of at least about 30% of a combined duration of said nonrebreathing period and said rebreathing period.

4. (Amended) The rebreathing method of claim 1, wherein said rebreathing period is effected for a duration of at least about 30% of a combined duration of said nonrebreathing period and said rebreathing period.

5. (Amended) The rebreathing method of claim 1, further comprising repeating said nonrebreathing period and said rebreathing period in sequence.

6. (Amended) The rebreathing method of claim 1, further comprising effecting said nonrebreathing period and said rebreathing period for a combined duration of at most about 2 minutes.

7. (Amended) The rebreathing method of claim 1, further comprising optimizing a duration of at least one of said rebreathing period and said nonrebreathing period.

8. (Amended) The rebreathing method of claim 1, wherein said effecting said nonrebreathing period includes obtaining respiratory measurements prior to said effecting said rebreathing period.

9. (Amended) The rebreathing method of claim 1, wherein a transition between said effecting said nonrebreathing period and said effecting said rebreathing period is gradual.

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10. (Amended) The rebreathing method of claim 1, further comprising optimizing durations of said nonrebreathing period and said rebreathing period.

11. The rebreathing method of claim 10, wherein said optimizing is based on ventilation of a patient.

12. The rebreathing method of claim 11, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

13. (Amended) A rebreathing method comprising:

causing a patient to inhale gas or a gas mixture comprising an increased amount of carbon dioxide for a rebreathing period of time;

causing the patient to inhale another gas or gas mixture comprising at least an amount of oxygen present in air for a nonrebreathing period of time, said rebreathing period of time and said nonrebreathing period of time being substantially the same.

14. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide and said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air are effected in immediate succession.

15. (Amended) The rebreathing method of claim 13, further comprising repeating said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide and said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air in sequence.

16. The rebreathing method of claim 13, wherein said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide is effected for a rebreathing period of about 30 seconds.

17. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air is effected for a nonrebreathing period of about 30 seconds.

18. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide is effected for a rebreathing time period comprising at least about 30% of a combined duration of said rebreathing period of time and said nonrebreathing period of time.

19. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air is effected for a nonrebreathing period of time comprising at least about 30% of a combined duration of said rebreathing period of time and said nonrebreathing period of time.

20. The rebreathing method of claim 13, wherein said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide comprises effecting a differential Fick technique.

21. The rebreathing method of claim 20, wherein said effecting said differential Fick technique comprises effecting partial rebreathing.

22. (Amended) The rebreathing method of claim 21, wherein said effecting said partial rebreathing comprises bi-directional rebreathing.

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23. The rebreathing method of claim 21, wherein said effecting said partial rebreathing comprises using a best-fit line method of rebreathing.

24. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air comprises permitting the patient to inhale air.

25. (Amended) The rebreathing method of claim 13, wherein at least one of said causing the patient to inhale gas or a gas mixture comprising an increased amount of carbon dioxide and said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air comprises assisting the patient's breathing with a ventilator.

26. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide and said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air are effected for a combined cycle period of at most about 2 minutes.

27. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air immediately follows said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide and is immediately followed by again causing the patient to inhale a gas or a gas mixture comprising an increased amount of carbon dioxide.

28. (Amended) The rebreathing method of claim 13, further comprising optimizing a duration of at least one of said causing the patient to inhale said gas or said gas mixture comprising said increased amount of carbon dioxide and said causing the patient to inhale said another gas or gas mixture comprising at least said amount of oxygen present in air.

29. (Amended) The rebreathing method of claim 13, wherein said causing the patient to inhale another gas or gas mixture comprising at least an amount of oxygen present in air for said nonrebreathing period of time is effected before initiation of rebreathing.

30. The rebreathing method of claim 13, wherein a transition between said causing the patient to inhale gas or a gas mixture and said causing the patient to inhale another gas or gas mixture is gradual.

31. (Amended) The rebreathing method of claim 13, further comprising optimizing said rebreathing period of time and said nonrebreathing period of time.

32. The rebreathing method of claim 31, wherein said optimizing is based on ventilation of the patient.

33. The rebreathing method of claim 32, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

34. A method for noninvasively estimating at least one of a pulmonary capillary blood flow and a cardiac output of a patient, comprising:

evaluating respiration of the patient during a first ventilation state; and

evaluating respiration of the patient during a second ventilation state having substantially a same duration as said first ventilation state.

35. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state is conducted immediately before said evaluating respiration of the patient during said second ventilation state.

36. The method of claim 35, further comprising repeating said evaluating respiration of the patient during another first ventilation state immediately following said evaluating respiration of the patient during said second ventilation state.

37. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state is effected for about 30 seconds.

38. The method of claim 34, wherein said evaluating respiration of the patient during said second ventilation state is effected for about 30 seconds.

39. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state is effected for a duration of at least about 30% of a combined duration of evaluating respiration of the patient during both said first ventilation state and said second ventilation state.

40. The method of claim 34, wherein said evaluating respiration of the patient during said second ventilation state is effected for a duration of at least about 30% of a combined duration of evaluating respiration of the patient during both said first ventilation state and said second ventilation state.

41. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state and said evaluating respiration of the patient during said second ventilation state are effected for a combined duration of at most about two minutes.

42. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state comprises bi-directional rebreathing.

43. The method of claim 34, wherein said evaluating respiration of the patient during said first ventilation state comprises employing a best-fit line method of rebreathing.

44. The method of claim 34, wherein said evaluating respiration of the patient during said second ventilation state comprises evaluating respiration of the patient while the patient is breathing air.

45. The method of claim 34, wherein said evaluating respiration of the patient during said second ventilation state comprises evaluating respiration of the patient while the patient is breathing gas or a gas mixture comprising at least a concentration of oxygen present in air.

46. The method of claim 34, further comprising optimizing a duration of at least one of said first ventilation state and said second ventilation state.

47. The method of claim 34, wherein said evaluating respiration of the patient during said second ventilation state is effected before initiation of the noninvasively estimating.

48. The method of claim 34, wherein a transition between said first and second ventilation states is gradual.

49. The method of claim 34, further comprising optimizing durations of said first and second ventilation states.

50. The method of claim 49, wherein said optimizing is based on ventilation of the patient.

51. The method of claim 50, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

52. A method for noninvasively estimating at least one of a pulmonary capillary blood flow and a cardiac output of a patient, comprising:

evaluating respiration of the patient during a first ventilation state;

evaluating respiration of the patient during a second ventilation state immediately following said first ventilation state; and

evaluating respiration of the patient during another first ventilation state immediately following said second ventilation state.

53. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state and said evaluating respiration of the patient during said second ventilation state are effected for substantially a same duration.

54. The method of claim 53, wherein said evaluating respiration of the patient during another first ventilation state is effected for substantially said same duration.

55. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state is effected for about 30 seconds.

56. The method of claim 52, wherein said evaluating respiration of the patient during said second ventilation state is effected for about 30 seconds.

57. The method of claim 52, wherein said evaluating respiration of the patient during another first ventilation state is effected for about 30 seconds.

58. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state is effected for at least about 30% of a combined duration of said evaluating respiration of the patient during said first ventilation state and evaluating respiration of the patient during said second ventilation state.

59. The method of claim 52, wherein said evaluating respiration of the patient during said second ventilation state is effected for at least about 30% of a combined duration of said evaluating respiration of the patient during said first ventilation state and said evaluating respiration of the patient during said second ventilation state.

60. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state and said evaluating respiration of the patient during said second ventilation state are effected for a combined duration of at most about 2 minutes.

61. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state comprises bi-directional rebreathing.

62. The method of claim 52, wherein said evaluating respiration of the patient during said first ventilation state comprises employing a best-fit line method of rebreathing.

63. The method of claim 52, wherein said evaluating respiration of the patient during said second ventilation state comprises evaluating respiration of the patient while the patient is breathing air.

64. The method of claim 52, wherein said evaluating respiration of the patient during said second ventilation state comprises evaluating respiration of the patient while the patient is breathing gas or a gas mixture comprising at least a concentration of oxygen present in air.

65. The method of claim 52, further comprising optimizing a duration of at least one of said first ventilation state and said second ventilation state.

66. The method of claim 52, wherein a transition between said second ventilation state and at least one of said first ventilation state and said another first ventilation state is gradual.

67. The method of claim 52, further comprising optimizing durations of said first and second ventilation states.

68. The method of claim 67, wherein said optimizing is based on ventilation of the patient.

69. The method of claim 68, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

70. A differential Fick technique, consisting essentially of:
a first phase in which a change in the effective ventilation of a patient is induced; and
a second phase during which said change in the effective ventilation of the patient is removed.

71. The differential Fick technique of claim 70, wherein durations of said first and second phases are substantially the same.

72. The differential Fick technique of claim 70, wherein said first and second phases each have a duration of about 30 seconds.

73. The differential Fick technique of claim 70, wherein a duration of said first phase is at least about 30% of a combined duration of said first and second phases.

74. The differential Fick technique of claim 70, wherein a duration of said second phase is at least about 30% of a combined duration of said first and second phases.

75. The differential Fick technique of claim 70, wherein said first and second phases are repeated in immediate sequence with one another.

76. The differential Fick technique of claim 70, wherein a combined duration of said first and second phases is at most about two minutes.

77. (Amended) The differential Fick technique of claim 70, wherein said first phase comprises a rebreathing phase and said second phase comprises a nonrebreathing phase.

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78. The differential Fick technique of claim 70, further comprising optimizing a duration of at least one of said first and second phases.

79. The differential Fick technique of claim 70, wherein said second phase occurs before said first phase.

80. The differential Fick technique of claim 70, wherein a transition between said first phase as said second phase is gradual.

81. The differential Fick technique of claim 70, wherein durations of said first and second phases are optimized.

82. The differential Fick technique of claim 81, wherein optimization of said durations of said first and second phases is based on ventilation of the patient.

83. The differential Fick technique of claim 82, wherein said optimization is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

84. A differential Fick technique, comprising:

inducing a change in effective ventilation of an individual for a first duration of time;

removing said change in effective ventilation for a second duration of time immediately following said first duration of time; and

obtaining measurements of at least one respiratory gas and of respiratory flow during both said first duration of time and said second duration of time.

85. The differential Fick technique of claim 84, further comprising repeating said inducing immediately following said second duration of time.

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86. The differential Fick technique of claim 85, wherein said repeating is again effected for said first duration of time.

87. The differential Fick technique of claim 85, including obtaining measurements of said at least one respiratory gas and said respiratory flow during said repeating.

88. (Amended) The differential Fick technique of claim 84, wherein said first duration of time of said inducing and said second duration of time of said removing are substantially the same.

89. (Amended) The differential Fick technique of claim 88, wherein said first duration of time of said inducing is at least about 30% of a combined duration of said first said duration of time and said second duration of time.

90. (Amended) The differential Fick technique of claim 88, wherein said second duration of time of said removing is at least about 30% of a combined duration of said first duration of time and said second duration of time.

91. The differential Fick technique of claim 88, wherein said inducing and said removing are both effected for about 30 seconds.

92. The differential Fick technique of claim 88, wherein a combined duration of said inducing and said removing is at most about two minutes.

93. (Amended) The differential Fick technique of claim 84, wherein said inducing comprises causing the individual to rebreathe.

94. (Amended) The differential Fick technique of claim 84, wherein said obtaining measurements comprises obtaining measurements of carbon dioxide in respiration of the individual.

95. The differential Fick technique of claim 84, further comprising optimizing at least one of said first duration of time and said second duration of time.

96. The differential Fick technique of claim 84, wherein a transition between said inducing said change and said removing said change is gradual.

97. The differential Fick technique of claim 84, further comprising optimizing said first and second durations of time.

98. The differential Fick technique of claim 97, wherein said optimizing is based on ventilation of the individual.

99. The differential Fick technique of claim 98, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the individual.

100. A method for noninvasively determining at least one of a pulmonary capillary blood flow and a cardiac output of a patient, comprising:
inducing a change in effective ventilation of the patient for a first period of time;
removing said change in effective ventilation of the patient for a second period of time immediately following said inducing; and
repeating said inducing immediately following said second period of time.

101. The method of claim 100, including obtaining measurements of at least one respiratory gas and respiratory flow during said inducing and said removing.

102. (Amended) The method of claim 101, wherein said obtaining measurements comprises obtaining a measurement of at least carbon dioxide in respiration of the patient.

103. The method of claim 100, wherein said first period of time of said inducing and said second period of time of said removing are substantially the same.

104. The method of claim 100, wherein said inducing comprises rebreathing.

105. The method of claim 100, further comprising optimizing at least one of said first period of time and said second period of time.

106. The method of claim 100, wherein a transition between said inducing said change and said removing said change is gradual.

107. The method of claim 100, further comprising optimizing said first and second periods of time.

108. The method of claim 107, wherein said optimizing is based on ventilation of the patient.

109. The method of claim 108, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.

110. A method for noninvasively determining at least one of a pulmonary capillary blood flow and a cardiac output of a patient, comprising:

evaluating respiration of the patient during a first phase in which a change in effective ventilation of the patient is induced for a first period of time; and

evaluating respiration of the patient following removal of said change in effective ventilation of the patient; said removal being effected for a second period of time immediately following said first period of time.

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111. The method of claim 110, further comprising repeating said first phase immediately following said second period of time and evaluating respiration of the patient during said repeating.

112. The method of claim 110, wherein each of said evaluatings is effected for substantially the same duration of time.

113. (Amended) The method of claim 110, wherein each of said evaluatings comprises measuring at least one respiratory gas and respiratory flow of the patient.

114. The method of claim 113, wherein said measuring at least one respiratory gas comprises measuring at least respiratory carbon dioxide of the patient.

115. The method of claim 110, wherein said evaluating respiration of the patient during said first phase comprises evaluating respiration of the patient during rebreathing.

116. The method of claim 110, further comprising optimizing at least one of said first period of time and said second period of time.

117. The method of claim 110, wherein a transition between said first phase and said removal is gradual.

118. The method of claim 110, further comprising optimizing said first and second periods of time.

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119. The method of claim 118, wherein said optimizing is based on ventilation of the patient.

120. The method of claim 119, wherein said optimizing is further based on at least one of a pulmonary capillary blood flow and a cardiac output of the patient.